Dew: How often? When? How much?
A Concern for Microwave Remote Sensing?

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USDA ARS US Department of Agriculture
Agricultural Research Service

Data collected during Soil Moisture Experiment 2005 (SMEX05).

Time period: 14 June to 5 July, 2005.

Location: US Midwest, near Ames, Iowa.

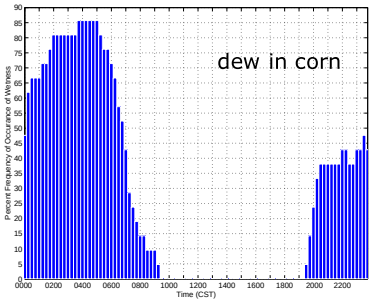
90% of land area in corn or soybean row crops.

Measurements: wetness sensors, manual sampling, micrometeorology, crop characteristics.

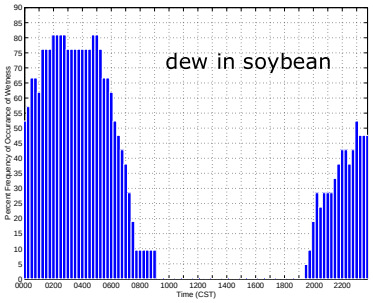
How often is dew present?

At what time of day is dew present?

More than 50% of the time at 6am.



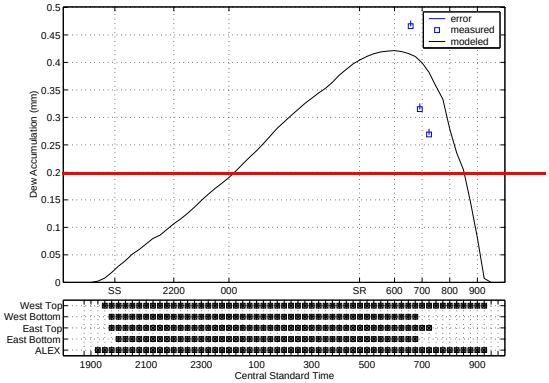
Percent of days during SMEX05 that at least one of four wetness sensors indicated dew in one field of corn (WC10) as a function of time of day.



Percent of days during SMEX05 that at least one of four wetness sensors indicated dew in one field of soybean (WC11) as a function of time of day.

How much dew is present?

Comparable, and in some cases higher, than amounts known to affect L-band brightness temperature.



Observed (manual measurements) and modeled (ALEX model) dew amount and duration in a corn canopy during a heavy dew event on 1-2 July. Tick marks "SS" and "SR" indicate the time of sunrise and sunset, respectively. A darkened box at the bottom of the figure means that specific wetness sensor or the model indicated dew at any point during that 15-minute interval.

A Concern for SMOS? **Perhaps.** A Concern for SMAP? **Likely.**

Effect of dew on L-band brightness temperature: probably less than 5 K.
Hornbuckle et al., 2006, Agricultural and Forest Meteorology.

Effect of dew on L-band backscatter: unknown, but likely significant.
3 dB for wheat at X-band (Allen et al., 1984), 4 dB for wheat at C-band (Gillespie et al., 1990).

Poster reference: Dew Frequency, Duration, Amount, and Distribution in Corn and Soybean During SMEX05, Ag. and For. Meteor., 2008. Contact: B. Hornbuckle, bkh@iastate.edu.